What is claimed is:

1. An induction coil form comprising:

a ceramic core having an outer surface; and

a coating layer bonded to at least a portion of the outer surface of the ceramic core, which is formed of a material more easily formed to precise tolerances than silicon nitride.

2. The induction coil form of claim 1, wherein the ceramic core is cylindrical in shape and formed of a material selected from the group consisting of silicon nitride and sialon.

3. The induction coil form of claim 1, wherein the coating layer comprises a material selected from the group consisting of a thermoplastic, an epoxy, a glass-filled epoxy, and a powdered ceramic.

4. The induction coil form of claim 1, wherein the coating layer comprises PEEK.

5. The induction coil form of claim 1, wherein a plurality of parallel grooves are formed into the coating layer.

6. The induction coil form of claim 1, wherein a single helical groove is formed into the coating layer.

7. The induction coil form of claim 1, further comprising an induction coil wrapped around the ceramic core.

8. The induction coil form of claim 1, wherein the ceramic core has a thermal expansion coefficient of less than about 1.8×10^{-6} per °F in a temperature range of below 0°F to about 1400°F.

9. The induction coil form of claim 1, wherein the coating layer remains bonded to the ceramic hollow core in a temperature range of below 0°F to about 500°F.

10. The induction coil form of claim 1, wherein the bond between the coating layer and the ceramic core can withstand temperature cycling in the range from below 0°F to about 500°F and pressure cycling from atmospheric pressure to about 30 ksi.

11. The induction coil form of claim 10, wherein the bond between the coating layer and the ceramic hollow cylindrical core can withstand temperature cycling in the range from 70°F to 500°F and pressure cycling from 0 to 25 ksi.

12. A method for making a ceramic induction coil form having a machinable outer surface for use in a logging tool, comprising the steps of:

forming a ceramic hollow core having an outer surface; and

bonding a coating layer formed of a material more easily formed to precise tolerances than silicon nitride to at least a portion of the outer surface of the ceramic hollow core.

13. The method of claim 12, further comprising the step of grinding the outer surface of the ceramic hollow core until it has a desired outer diameter within a desired tolerance, wherein the grinding step is performed after the ceramic hollow core has been formed, but before the coating layer is bonded to its outer surface.

14. The method of claim 13, further comprising the step of machining the coating layer so as to form a plurality of parallel circumferential grooves around the outer surface of the induction coil form.

15. The method of claim 14, wherein the parallel circumferential grooves are machined to the point where portions of the outer layer of the ceramic hollow core initially covered by the coating layer are exposed.

16. The method of claim 14, further comprising the step of wrapping a induction coil around the ceramic hollow core in the parallel circumferential grooves.

17. The method of claim of 12, wherein the ceramic hollow core is cylindrical in shape and formed of a material selected from the group consisting of silicon nitride and sialon.

18. The method of claim 12, wherein the coating layer comprises a material selected from the group consisting of a thermoplastic, an epoxy, a glass-filled epoxy, a powdered ceramic.

19. The method of claim 12, wherein the coating layer comprises PEEK.

20. The method of claim 12, wherein the coating layer remains bonded to the ceramic hollow core in a temperature range of below 0°F to about 500°F.

21. The method of claim 12, wherein the bond between the coating layer and the ceramic hollow core can withstand temperature cycling in the range from below 0°F to about 500°F and pressure cycling from atmospheric pressure to about 30 ksi.

22. The method of claim 21, wherein the bond between the coating layer and the ceramic hollow core can withstand temperature cycling in the range from 70°F to 500°F and pressure cycling from atmospheric pressure to about 25 ksi.